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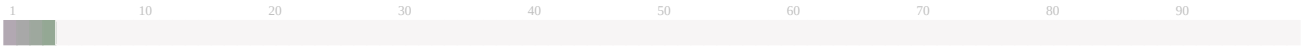

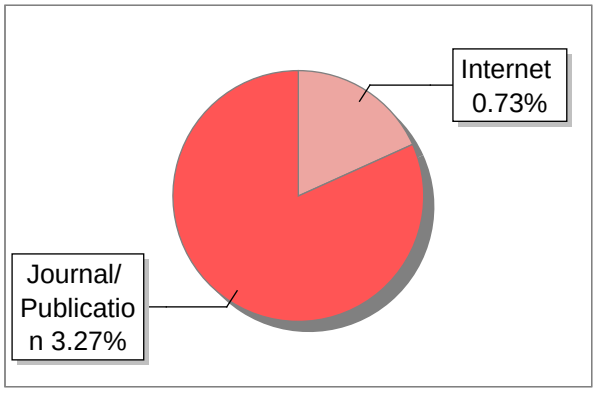

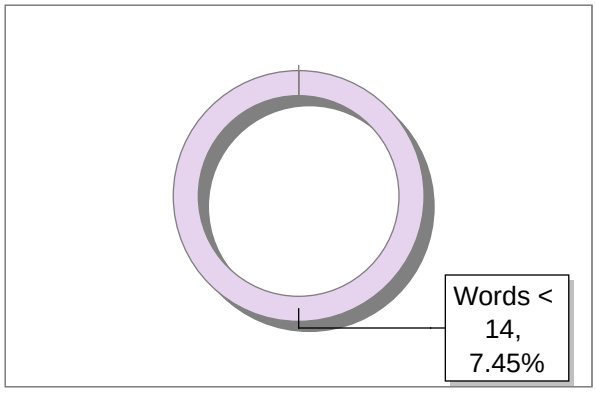

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3	Effect of Peak Flow Monitoring on Child Asthma Quality of Life by Patrici-2012	1	Publication
4	worldwidescience.org	1	Internet Data
5	www.indianjournals.com	<1	Publication
6	THE ANALYSIS OF UPPER LIMB MOVEMENT AND EMG ACTIVATION DURING THE SNA, by CHEN, SHEN-KAI WU,- 2013	<1	Publication

DEVELOPMENT OF ADVANCED PULMONARY REHABILITAION EXERCISE PROTOCOL TO IMPROVE QUALITY OF LIFE IN COPD PATIENTS.

INTRODUCTION

COPD is the third most common cause of death worldwide. Typically, a progressive condition, it is defined by a restricted air flow that is not entirely curable. Chronic cough, Sputum production and Dyspnea are typical symptoms. (1)

An substantial genetic component of COPD influences how the disease responds to its surroundings both during and after conception. Although smoking was always thought to be the primary cause of COPD, but that is only the case in high-income nations and that the majority of cases occur in less developed regions of the world due to a number of other variables, most notably pollution and biomass. (4)

Using data from 23 researches with an aggregate of 80,138 study participants in India, the current study's meta-analysis obtained a COPD prevalence of 7.0%. Based to our outcomes, the prevalence of COPD is lower than the global prevalence, varying from 10.7% to 12.1%.(6) A meta-analysis and systemic review was conducted with the aim to study prevalence of COPD in India. The study was suggestive of 7.4% with higher prevalence in males, in urban area and northern region. (7)

Patients with respiratory system limitations such as COPD have Exertional Dyspnea, Exercise Intolerance, Poor Ventilatory Efficiency. Also, co - morbid conditions such as Heart Failure and Pulmonary Hyper-tension have been found to increase the severity. (2)

Exercise restriction is characteristically multifactorial in Cardio-respiratory illness. The following are known physiological causes:

(a) structural anomalies (airways, lung parenchyma, chest wall)

(b)reduced pulmonary gas exchange

(c)abnormalities of the pulmonary and peripheral muscles

(d)cardiocirculatory irregularities. (3)

Being a heterogeneous disease, COPD must be managed using a multidisciplinary strategy. (5) Patients with COPD frequently restrict their physical activity to prevent breathing difficulties which reduces their capacity for exercise and worsens quality of life (QoL) indicators like anxiety and impairment. Therefore, this population requires extensive therapy including measures to reduce the feeling of breathlessness and enhance exercise capacity and quality of life. (8)

Breathing Exercises directly target the respiratory muscles are a direct kind of training that are less constrained by the environment. It is a powerful at-home lung rehabilitation technique that COPD patients can use on their own. (9) Breathing exercises include diaphragmatic breathing (DB), expiratory muscle training (EMT), and combined training exercises. They are any means of breathing that can allow deeper inspiration or expiration or modify the pace, sequence, or rhythm of respiration. (10)

It is contented that respiratory rehabilitation is a crucial component of conventional therapy options, with IMT included in the therapeutic programme. (5) IMT is anticipated to enhance endurance and power of respiratory muscles, tolerance to physical exertion, shortness of breath, breathing capacity, day to day activities and health related quality of life. (11)

NEED OF THE STUDY

COPD patients post COVID have reduced exercise capacity which leads to breathing difficulties and worsen QOL.

Studies have done which show Pulmonary Rehabilitation Exercises like Inspiratory Load Training/ Expiratory Load Training and Breathing exercises have been administered in managing COPD. But there is a lack of high-quality studies to determine the precise utility of such exercises in clinical use.

A validated pulmonary exercise protocol is needed to be developed which may be helpful to bring significant improvement in health related Quality of life and Respiratory health of the COPD patients.

RESEARCH QUESTION

- How has onset of COPD led to effect on Quality of Life and Respiratory health of COPD patients.
- How will application of the developed Advanced Pulmonary Rehabilitation Exercise Protocol will bring changes in Quality of Life and respiratory health of COPD patients.

AIM OF THE STUDY

- To study the respiratory complications in COPD patients.
- To study the effects on Quality of Life in COPD patients.
- To develop and Advanced Pulmonary Rehabilitation Exercise protocol which can bring changes in respiratory health and Quality of Life of patients suffering with COPD.
- To analyse and interpret the results of the developed exercise protocol.
- To get it validated by experts of the concerned field like senior Cardiopulmonary Physiotherapists.

OBJECTIVES

- To study different symptoms of COPD patients responsible for deterioration of the Quality of Life.
- To develop and advanced exercise protocol for better Quality of Life of COPD patients.
- To validate the developed protocol for management of Quality of Life of COPD patients using different parameters.

HYPOTHESIS

NULL HYPOTHESIS: The developed Pulmonary Rehabilitation Exercise protocol will not bring any improvement in Quality of Life of COPD patients.

ALTERNATIVE HYPOTHESIS: The developed Pulmonary Rehabilitation Exercise protocol will bring an improvement in Quality of Life of COPD patients.

REVIEW OF LITERATURE

1. **Lin Yang et al (2023):** The study concluded that the functional residual capacity in COPD may not be able to be reduced by diaphragmatic breathing alone, and the result differed greatly from patient to patient. Different COPD patients experienced conventional breathing exercises differently. To maximise training effectiveness, breathing exercises might need to be customised.
2. **Parisa Sedaghati et al (2023):** This investigation looked at how breathing and corrective workouts affected patients with a history of COVID-19 infection to improve their respiratory function. It appears that a thorough training regimen, which includes rehabilitative and breathing exercises, can be beneficial as an additional therapy for easing chronic pulmonary problems in patients with covid 19 history.
3. **Harold A. Matos Casano et al (2023):** A basic method for assessing cardiopulmonary function is the six-minute walk test. Because of its simplicity, it enables a non-specific, comprehensive evaluation of all the systems engaged in physical activity. In particular, its findings may help determine the extent of functional impairment and may influence treatment changes for specific respiratory and cardiovascular diseases.
4. **Cleofas Rodríguez-Blanco et al (2023):** The study found that, the strength exercise and breathing exercises groups significantly improved their levels of fatigue, dyspnea, perceived effort, and physical state; however, the breathing exercises group showed the biggest improvements in dyspnea and aerobic capacity. Future studies could also focus on determining whether implementing programs that incorporate both kinds of exercise is better for managing these patients.
5. **Mario C. Ponce et al (2023):** Pulmonary Function Tests enable medical professionals to evaluate the response to treatment, track the progression of the pulmonary illness, and determine its severity.
6. **Daines Luke et al (2022):** The purpose of the review was to study the epidemiology, clinical characteristics and research goals for long term focus on respiratory system. The most prevalent symptoms associated were breathlessness, cough, chest pain. As management symptomatic treatment, assistant selfcare and cardiopulmonary rehabilitation should be taken into consideration.
7. **R. Peroy Bodal et al (2022):** A cross sectional study analyzing Oxygen saturation, Heart rate and modified Borg Scale in Six MWT, One minute STST and Chester Step Test was

conducted, all the tests significantly corelated with each other in the assessment of functional capacity.

8. **Eva Vázquez-Gandullo et al (2022):** Patients with COPD and inspiratory muscle weakness may benefit from an IMT program as part of respiratory rehabilitation in order to improve their quality of life and symptoms, particularly dyspnea, however it is unclear how this improvement is accomplished. improvements in exercise tolerance, dyspnea improvement, and health-related quality of life have been demonstrated by respiratory rehabilitation and IMT programs that last the whole suggested duration of 6 to 12 weeks.
9. **Vignesh Srinivasan et al (2021):** An experimental study was done on patients where PLB with Bhastrika Pranayama was compared to Incentive Spirometry and FVC and FEV1 were recorded. It concluded that both the manoeuvres showed significant improvement.
10. **Mustafa Ilteris Bardakci et al (2021):** To assess pulmonary function, exercise capacities and health related QOL, spirometry 6 MWT, short form of health related QOL scale (SF-36) were applied. This proves the reliability and validity of these scales being frequently used for such analysis.
11. **Vasileios Flampouraris et al (2021):** Shortness of breath or dyspnea is a frequent and distressing complaint. Being out of breath is a sign of poor working of respiratory system. To assess that Borg Scale was used and concluded that it has been successful.
12. **Budiman et al (2021):** The findings indicated that DBEs could lessen the degree of dyspnea that patients experienced. In order to teach patients how to conduct DBEs when experiencing dyspnea, health education may be offered. Future research using rigorous methodologies and sizable sample sizes is needed to assess the precise impact of DBEs on symptom reduction and quality of life improvement in COPD patients.
13. **Donna.M.mancini et al (2021)**: The researcher performed CPET on 41 patients who were symptomatic post covid to assess myalgic encephalomyelitis/chronic fatigue syndrome and concluded that circulatory impairment, abnormal ventilatory pattern and ME/CFS were common in them. Also CPET is an important tool to assess such patients.'
14. **Hayley Lewthwaite et al (2021):** The most popular tool, the Borg 0–10 category rating scale, contains estimations for an MCID during exercise. Measurements of the degree of dyspnea during exercise should be made at a standard submaximal point, regardless of whether the tests are conducted in a lab setting or in the field. The instruments to be used for assessing dyspnea in daily life and in connection with physical activity in individuals with COPD are recommended.

15. **V. Fazekas-Ponger et al (2021):** According to the findings, in order to ensure that patients have a higher quality of life, complex therapy for COPD should address comorbidities, promote physical activity, assist smoking cessation, and improve lung function in addition to preventing exacerbation.
16. **Bilel Tounsi et al (2021):** According to the Berg Balance Scale and the Activities-specific Balance Confidence Scale, IMT combined with ET improves inspiratory muscle function and functional balance in COPD patients when compared to endurance training alone. Our proposal is to incorporate IMT into PR programs with the goal of enhancing balance in individuals with COPD.
17. **Keisuke Miki et al (2020):** The literature suggests that exercise performance is enhanced in COPD patients by Exhalatory or Inspiratory Load Training(EXP/IPT) based on the length of extended expiration, treatment might become popular as home-based training if managing COPD with EPT/IPT is chosen properly.
18. **Hidetaka Hamasaki et al (2020):** The study was suggestive of effects of DB on brain, cardiovascular, respiratory and gastrointestinal systems. Also, according to the study DB seems to be useful in enhancing ability to exercise and respiratory system. Although it is necessary to explore how DB affects QoL of asthma patients. The lack of high quality studies makes it difficult to determine the precise utility of DB in clinical practise.
19. **Cristóbal Esteban et al (2020):** The study showed that the whole clinical state of COPD patients was summed up by HRQoL, which also reflected the influence of other significant associated variables that persisted in being influential over time. Hospitalisations for aggravation and physical activity were two important modifiable factors that affected HRQoL. Additionally, it is worthwhile to look into an alternative methodological approach to HRQoL.
20. **Andrew I. Ritchie et al (2020):** It's well known that immunological and host defense deficiencies cause acute exacerbations of COPD to occur more frequently. Elevated mortality, deterioration in quality of life, and faster reduction in lung function are all linked to more frequent exacerbations.
21. **J. Alberto Neder et al (2020):** Lung function testing has undisputed value in the comprehensive assessment and individualized management of chronic obstructive pulmonary disease, a pathologic condition in which a functional abnormality, poorly reversible expiratory airway obstruction, is at the core of its definition.
22. **Miguel Divo et al (2020):** Comorbidities make dealing with COPD more difficult and should be assessed because they might have significant effects on both identification and course of

treatment. Innovative methods designed to integrate the various morbidities associated with COPD and other chronic illnesses will open up new research directions and enable the development of more thorough and efficient treatment strategies.

23. **Emiel FM Wouters et al (2020):** One of the most important aspects of treating patients with (COPD) is pulmonary rehabilitation. In order to attain the maximal level of independence, autonomy, and functioning of the patient, focused therapies and interventions based on the assessment of physical, emotional and social features need to be delivered by a dedicated, interdisciplinary PR team.
24. **Renata I N Figueiredo et al (2020):** According to the study, isolated IMT enhanced pulmonary function, functional capacity, and inspiratory muscle strength without affecting dyspnea or quality of life. Only inspiratory muscle strength increased in association with IMT. These findings suggest that in COPD patients, isolated IMT may be used as an adjuvant strategy.
25. **Priya Agarwal (2020):** A popular test for the objective evaluation of functional exercise capacity in the treatment of patients with moderate-to-severe lung illness is the 6-min walk test (6MWT).
26. **Karina Berner (2020):** Combining strengthening appears to provide substantial positive short-term benefits on FEC in individuals with COPD, according to Level II research. The low number of research and sample sizes have an impact on the results.
27. **Adriano Florencio Vilaco et al (2019):** The study was conducted with aim to study the effect of IMT using Power Breathe on QoL, inspiratory muscle strength of elderlies. The findings showed that Maximal Inspiratory Pressure, QoL and Functional Capacity improved with IMT.
28. **Guan–Sheng Zeng et al (2019):** A study with an aim to study the association between 6MWT and other physiological COPD markers and concluded that steps of 6MWT (S6MWT) is effective in assessing functional status and QoL in COPD and has a strong association with several measures indicating severity of condition.
29. **Catharinne Angélica Carvalho de Farias et al (2019):** The study showed that the best IMT modality may be included in conventional PR programs, thus optimizing the therapeutic management of COPD patients. We also hope that these findings endorse adjustments to the modalities used for respiratory muscle strengthening, as we believe that a well implemented therapeutic program may reduce the morbidity/mortality rates for these individuals as well as improve their quality of life.

30. **IGOR GRYGUS et al (2019):** Following the implementation of the suggested physical rehabilitation program in patients with severe COPD, we saw improvements in the experimental group's patients' general health and overall quality of life. Indicators in problematic aspects increased, which led to an improvement in living quality. The experimental group's patients reported less pain, reduced drug addiction, increased vital activity, better mobility, decreased exhaustion, improved sleep, sharper thinking, and improved interpersonal relationships.
31. **Cath O'Connor et al (2019):** Although adherence levels varied and behavior modification strategies may need to be used in conjunction with IMT in future research, this exploratory investigation of IMT in those who declined PR achieved its goals and demonstrated that IMT could be executed with ease and was well-received by participants.
32. **Arum Dwi Ningsih et al (2018):** Patients with COPD may see improvements if pursed lips breathing and walking exercises are implemented. Given that lung damage was not entirely reversible in COPD patients, it was crucial to maintain stable conditions and avoid exacerbations. This was undoubtedly highly beneficial in treating these individuals. The lack of this study is due to the research journals' requirements, specifically their lack of consistency in terms of research techniques.
33. **Rainer Gloeckl et al (2018):** By employing equipment designed specifically for this purpose, respiratory conditioning can enhance the ability of the inspiratory muscles, making them more capable of absorbing the sudden spike in exertion that comes with physical activity. The following was revealed by pooled data from a systematic review of 32 studies: respiratory strength of muscles, physical performance ability, and exertion-related dyspnea can all be substantially enhanced when inspiratory muscle training is the only intervention.
34. **Marc Beaumont et al (2018):** IMT reduces dyspnea (BDI-TDI) and increases inspiratory muscle strength, quality of life (SGRQ), and exercise capacity (6MWT). More research is need to determine how IMT affects dyspnea and quality of life, though. The connection between IMT and pulmonary rehabilitation needs special consideration.
35. **Magdalena Brandl et al (2018):** Patients with chronic obstructive pulmonary disease (COPD) have reduced HRQOL, however the reasons influencing HRQOL are still unclear. This study measures patients' quality of life and looks for factors that are related to HRQOL. It came to the conclusion that patient-reported outcomes and screening for anxiety and depression before and after possible treatment could be effective ways to help patients with COPD have better HRQOL.

36. **Maria Kerti et al (2018):** Enhancements in exercise tolerance had correlation with changes in IVC, BODE-index, and the new Alternative Scale. However, comprehensive assessment needs to include considerations of chest kinematics and peripheral and respiratory muscle function as well.
37. **Shahriar Sakhaei et al (2018):** Patients with obstructive pulmonary illness benefit greatly from the application of Pursed-lips Breathing (PLB) training, which activates the autonomic nervous system, promotes relaxation, and improves physiological parameters. The study's findings suggest that the use of efficient PLB, a simple, affordable, non-invasive, and non-pharmacological technique, can significantly improve the oxygenation and physiological indicators of COPD patients. As such, it should be a crucial component of these patients' rehabilitation regimens.
38. **Victor Kim et al (2018):** Exacerbations of COPD are frequent and have significant clinical and financial ramifications, such as decreased productivity at work, higher healthcare resource usage, temporary or permanent declines in lung function and exercise ability, hospitalization, and occasionally even mortality.
39. **Yuqin Zeng et al (2018):** Individuals with COPD experience a decrease in activity due to skeletal muscle failure. Pulmonary rehabilitation, or PR, is a crucial component of COPD care that relieves dyspnea and tiredness, enhances exercise tolerance and health-related quality of life, and lowers hospital admission and death rates for COPD patients.
40. **Timothy M. Dempsey et al (2018):** The findings may point to respiratory as well as non-respiratory conditions, and they may also aid in the identification of neuromuscular or cardiac conditions. This review, written with the generalist in mind, explains typical results from pulmonary function tests and offers a framework for interpretation.
41. **Frits M. E. Franssen et al (2018):** The results of this study indicate that mild-to-moderate COPD patients should be managed beyond the point of lung function deterioration, and that measures for assessing integrated health status should be used early in the course of the illness.
42. **Duruturk et al (2018):** The data show that IMT may be an efficient way to promote respiratory muscle power, endurance, quality of life, activities of daily living, reduced sense of breathlessness, and tiredness in asthmatic patients.
43. **Anan Jarab et al (2018):** Apart from the deficiency of understanding regarding COPD and its treatment, it was apparent that COPD patients had adverse physical and psychological consequences. The results of the current study should be included into future clinical

pharmacy services and disease management programs to enhance the health outcomes of COPD patients.

44. **Anamaria Fleig Mayer (2018):** PLB helps COPD patients exercise more efficiently by lowering their respiratory rate and minute ventilation. It will take further research with higher quality methods to fully comprehend the effects of its acute usage on COPD patients' symptoms and FVC.
45. **Jirakrit Leelarungrayub et al (2017):** The was suggestive of a view that a straight forward device can be used in COPD patients as a regular tool to train Respiratory Muscles, Enhancing Lung Function and QOL.
46. **Mark T. Dransfield et al (2017):** The flare-ups are linked to rapid loss of lung function in patients with established COPD, especially in those with moderate illness. Experiments are required to evaluate both new and current treatments for early-stage or mild COPD in order to possibly lower the likelihood of the condition developing into more severe lung disease.
47. **S.E. Roberts et al(2017):** In this study, the long-term usage of PLB was maintained by 9 out of 13 patients who learned it, and 8 out of 13 patients reported a clear benefit. Novel results included the function of PLB in boosting patients' trust in their capacity to control dyspnea and usage at night.
48. **Dicle Kaymaz et al (2017):** This study demonstrated the relationship between upper limb muscular strength and exercise ability, quality of life, and dyspnea feeling. Patients with larger strength decreases can be identified for early, multimodal therapy.
49. **Jana De Brandt et al(2017):** Patients with COPD frequently have muscular atrophy and weakness in their lower limbs. Although there is a lot of diverse and comprehensive research on the subject, exercise-based training has the ability to increase muscle growth and function.
50. **André Nyberg et al (2016):** This article provides healthcare professionals with an introduction and explanation of the various exercise modalities and its impact on limb muscle performance. It also examines the many components of exercise training within PR utilized to enhance limb muscle function in COPD.
51. **Brenda Morrow et al (2016):** The study was conducted with the aim to study the effect of Positioning and Diaphragmatic Breathing on respiratory muscle activity inpatients of COPD and was conclusive of transient improvement in diaphragmatic muscle activity.
52. **Manvela Karloh PT et al (2016):** In order to categorise patients into new Global Initiative for COPD Classification System, this study set out to review factors that determine CAT scores and figured out that it can predict mortality risk, depressive risk, acute health status deterioration and exacerbation risk.

53. **Monika Jeryc Tansek et al (2016):** The conclusion of the literature is that individuals with various disorders can benefit from specific IMT because it is secure and effective. According to a number of research each change needs to be considered. Additionally it is anticipated that IMT will lower the risk of Respiratory problems.
54. **Hye-Young Kwon et al (2016):** The purpose of this study is to investigate the variables influencing COPD patients' health-related quality of life (HRQOL). According to this study, quality of life falls as one gains COPD severity. In order to enhance quality of life, such complications should be closely monitored.
55. **Jincy Ealias et al (2016):** In the current study, COPD patients are examined to determine the impact of pursed lip breathing exercise on physiological parameters such as heart rate, respiratory rate, and peak expiratory flow rate. Physiological parameters were assessed before and after the pulse lip breathing exercise in patients and concluded that pursed lip breathing exercise is useful in returning physiological parameters including heart rate, respiration rate, and peak expiration flow rate to normal.
56. **Carri Hand et al (2016):** The study suggests that scales like the WHOQOL-BREF that recognize the individualized nature of HRQOL and are based on a broad concept of health are useful. The use of this measure for people with chronic illnesses is supported by psychometric evidence; further data regarding its responsiveness is required.
57. **Paul W Jonesat al (2016):** Patients' quality of life (QoL) is negatively impacted by COPD symptoms, which can be measured with short health-status questionnaires. A patient-centered approach to disease management can help to improve aspects of QoL and subsequent outcomes in COPD patients.
58. **Rasha Daabis et al (2016):** PR is a useful strategy for managing COPD patients after an exacerbation. Significant improvements are shown in HRQL, functional exercise capacity, and dyspnea. Strength training adds advantages to an ET program in terms of muscle force, but not in terms of total exercise capacity or health.
59. **Vladimir Koblizek et al (2016):** The most typical symptoms of COPD include weariness, intolerance to physical exercise, dyspnea, and cough. Dyspnea initially manifests during high-intensity exercise, then during low-intensity exercise, and finally during rest. Lack of breath gradually leads to exercise intolerance, which causes COPD sufferers to become sedentary, drastically alter their lifestyles, and isolate themselves from others.
60. **Arwel W. Jones et al (2016):** Our research reveals the current underappreciation of intervention studies in this domain, despite growing awareness of patient obstacles to pulmonary rehabilitation. This is an urgent demand for greater evidence to inform the

pulmonary rehabilitation service route. Subsequent investigations have to employ superior research strategies with the objective of tackling the primary modifiable obstacles to participation and fulfillment.

61. **Aydanur Ekici MD et al (2015):** This study demonstrated a significant negative correlation between HRQOL and COPD severity measures. Several factors affect the health condition of individuals with COPD.
62. **Steven D. Nathan et al (2015):** The study came to the conclusion that 6MWD is a reliable and valid clinical endpoint that offers clinically significant and objective data on functional state and short-term prognosis. These outcomes validate earlier discoveries in a separate group of patients suffering from idiopathic pulmonary fibrosis.
63. **Vasileios Andrianopoulos et al (2015):** The research findings indicate that the variables generated from the 6 MWT, including 6 MWD, 6 MWSpeed, 6 MWW, DSP, incidence of EID, unplanned stop(s), and the BODE score, are significant predictors of hospitalization and long-term mortality in patients with COPD.
64. **Ghofraniha et al (2015):** A well-tolerated test that is representative of daily activities and simple to employ in clinical practice is the six-minute walk test (6MWT). The 6MWT offers data on prognosis, functional ability, and responsiveness to treatment for a variety of chronic cardiovascular disorders.
65. **Christine Råheim Borge et al (2014):** The summary shows that before conclusive, high-quality SRs can be carried out, more research utilizing the RCT design is required, particularly on breathing control exercises but also on the various methods of respiratory muscle training.
66. **Leandro Ferracini CABRAL et al (2014):** According to this study, there is little data on the benefits of pursed lip breathing (PLB) on dynamic hyperinflation (DH) and exercise tolerance, despite the fact that PLB has been recommended to lower respiratory rate and enhance oxygen saturation in patients with chronic obstructive pulmonary disease (COPD) at rest.
67. **Seiichi Kobayashi et al (2014):** In older individuals with COPD, age and certain geriatric diseases have a significant detrimental effect. The care of elderly COPD patients should take geriatric issues into consideration.
68. **Mo`nica Monteagudo et al (2013):** Improving the health status of people with COPD is a main goal of treatment. While there were only slight overall changes in HRQoL after a year, over one-third of patients showed significant improvement, and another third showed significantly worse HRQoL. Clinical variables were linked to these modifications separately, highlighting the importance of adopting a healthy lifestyle and receiving respiratory

treatments for enhancing HRQoL and the detrimental effects of COPD symptoms and hospitalizations on HRQoL.

69. **Rachel Garrod et al (2013):** The main debate around PLB isn't so much about its effectiveness; more than 10 years ago, there was enough data to conclude that PLB increases tidal volume, arterial oxygen pressure, and oxygen saturation2; decreases respiratory rate, minute ventilation, and carbon dioxide level; and we demonstrated favorable effects on respiratory rate and recovery time after exercise.
70. **Ahmed S. Elmorsy et al (2012):** Studies have shown that without affecting pulmonary function, UL and LL exercise training in COPD patients resulted in a clinically significant improvement in health-related quality of life and exercise tolerance as well as a reduction in death risk as indicated by the BODE index.
71. **Ali Gholami et al (2012):** The results of this investigation verify that the WHOQOL-BREF questionnaire is a dependable tool for assessing the quality of life of healthcare personnel.
72. **Mohammed A. Zamzam et al (2012):** The study suggests that for COPD patients, quality of life is compromised, and this worsens significantly as the condition progresses. The SGRQ-C score significantly increases with increasing COPD severity. QOL should be measured in addition to pulmonary function testing when evaluating individuals with COPD.
73. **Seema Aziyakath Shavro et al (2012):** According to this study, Indian COPD patients exhibited lower HRQOL. HRQOL was adversely affected by a longer course of the disease, the patient's assessment of the disease's severity, and increased dyspnea.
74. **Frank J. Visser et al (2010):** This research provided evidence for a reduction in hyperinflation in patients with severe COPD and a potential increase in the collapsibility of the bronchial airways by demonstrating an improvement in Inspiratory Capacity following Pursed Lip Breathing. Additionally, Breathing Frequency, SO 2, and end-tidal pCO 2 improved.
75. **Eanes Delgado Barros Pereira et al (2009):** The Medical Outcomes 36-item Short-Form Survey (SF-36) and the Saint George's Respiratory Questionnaire (SGRQ) were used in a study to assess the quality of life of COPD patients. The results concluded that a decline in FEV1 is linked to a lower quality of life as measured by the SGRQ.

METHODOLOGY

STUDY DESIGN: Quasi-Experimental research design

SOURCE OF DATA: Phase 1: Pubmed, Elseiver, Google Scholar, Cochrane Library

Phase 2: Multicentric Clinical settings of Dehradun (Uttarakhand)

SAMPLING: Convenience Sampling

SELECTION CRITERIA

INCLUSION CRITERIA:

- Age 50 and above.
- Patients diagnosed with stable COPD post Covid.
- Patients of both genders

EXCLUSION CRITERIA:

- Patients with other respiratory disorders such as asthma, pneumonitis, any kind of lung surgery, etc.
- Patients with other such diseases which alter quality of life and respiratory health like hypertension, diabetes mellitus etc.
- Athletes and sports persons.
- Patients with cardiac related health issues.

PROCEDURE

The procedure will consist of following steps:

- Search for related Review of Literature will be done through various sources like Google scholar, Elseiver, Pubmed, Textbooks, etc.
- Sample selection will be done in multicentric clinical settings of Dehradun (Uttarakhand).
- The number of subjects were calculated by statistician. Using statulator, assuming a pooled standard deviaton of 50.85 units, the study would require a sample size of 42. The sample size will be increased to assuming 5% loss to follow up. To achieve more accurate and efficacious results we will increase the sample size to 120 as guided by the experts.
- The subjects will be thoroughly educated about the procedure of the research program and a duly signed consent form will be taken from all the agreed subjects.
- A fully monitored session of the developed pulmonary rehabilitation exercise protocol will be given twice a week for 4 weeks to the subjects.
- Pre and post assessment of the subjects using HRQOL Scale for Quality of Life and 6MIN Walk test and Borg's Scale for Dyspnoea and Pulmonary Function Tests to assess total lung volume will be done.
- The resulting gender-specific regression equations of 6 Minute Walk Test explained about 40% of the variance in the distance walked for healthy adults: for men, 6MWD = (7.57 x height cm) - (5.02 x age) - (1.76 x weight kg) - 309 m, and for women, 6MWD = (2.11 x height cm) - (2.29 x weight kg) - (5.78 x age) + 667 m.
- The questionnaires used to measure HRQOL for Quality of Life and Borg's scale for Dyspnoea are given in the annexures.
- Assessment of data.

DATA ANALYSIS

The data will be analysed using SYSTAT 13.2.

For the calculation of data Unpaired T test will be used.